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Amdt. Dated April 5, 2004  
Reply to Office action of November 5, 2003

### **REMARKS**

Reconsideration and allowance in view of the following amendments and remarks are respectfully requested.

Claims 1-2, 4-18, 53-58 and 63 remain in this application. Claims 3 and 21 have been canceled. Claims 19-20, 22-52 and 59-62 have been withdrawn. Claim 63 has been added, incorporating the feature as disclosed on page 9, paragraph 5 of the disclosure.

### **Objections to the Drawings**

The Examiner has objected to the drawings under 37 C.F.R. § 1.83(a). The Examiner asserts that the features of claims 54-57 must be shown in the drawings. Claims 54-57 are directed to producing different types of workpieces, e.g., wires, rods, tubing, coiled springs, et al. In response to a voice message that the Applicants left on December 5, 2003, the Examiner left a voice message with Applicants on December 8, 2003. The Examiner indicated that the Applicants could disregard the drawing objection, as drawings directed to these features are unnecessary because headrest brackets, coiled springs, and through holes are well known in the art. Accordingly, Applicants request that this objection be withdrawn.

### **Objections to the Specification**

The Examiner has objected to the title and abstract as not descriptive. The title and abstract have been amended as indicated above. Applicants therefore respectfully request that these objections be withdrawn.

The disclosure is objected to for including references to the claims on pages 2-16 of the specification. As indicated above, the specification has been amended to remove these references. Accordingly, Applicants request that this objection be withdrawn.

### **Rejections Under 35 U.S.C. § 112**

Claims 1-18 and 53-58 stand rejected as indefinite under 35 U.S.C. § 112, second paragraph. Claim 1 was rejected for using the terms "said workpiece" and "the treated surface"

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without proper antecedent basis. Claim 1 has been amended to provide proper antecedent bases for these terms; Applicants therefore respectfully request that the rejection of claim 1 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claims 4-6, 12, and 18 were rejected for including using terms without proper antecedent bases. These claims have been amended to provide proper antecedent bases; Applicants therefore request that these rejections be withdrawn.

Claims 7, 10, and 11 were rejected for unclear use of the terms “a lead position substantially opposing/the same to each other.” These claims have been amended to clarify that the beads and recesses are arranged at a first angle and a second angle to the longitudinal centerline, and that the first angle and second angle have either the opposite or the same sign. Applicants therefore request that these rejections be withdrawn.

Claim 56 was rejected for unclear use of the limitation “for producing bores or through-holes and/or blind holes in automotive engines.” Claim 56 has been amended to include the limitation that “the surface of the workpiece that is treated is an interior surface of a bore, a through-hole and/or a blind hole in an automotive engine.” Applicants therefore request that this rejection be withdrawn.

The Office Action does not explain why claims 2, 8-9, 13-17, 53-55, and 57-58 stand rejected under 35 U.S.C. § 112, second paragraph. It is assumed that they were rejected as dependent on rejected base claims. As the rejected claims have been amended as indicated above, Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 112 be withdrawn.

### **Rejections Under 35 U.S.C. § 103**

**Rejections Under 35 U.S.C. § 103(a) using Applicant’s Admitted Prior Art (AAPA) in view of Abramsen (U.S. Patent No. 4,185,484):**

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Claims 1-4, 6-11, 18, 53, 54, and 58 stand rejected under 35 U.S.C. § 103(a) as being obvious over AAPA in view of Abramsen. The Examiner asserts that AAPA teaches that it is known to surface treat workpieces of aluminum and/or alloyed aluminum in which the workpiece is worked at least in part, and that the remaining elements of the rejected claims are either taught by Abramsen or otherwise obvious.

Regarding claim 1, the Examiner asserts that Abramsen discloses a workpiece that is worked in part by at least one roll with an outer profile having the form of annular beads and recesses, comprising the steps of exposing the surface of the workpiece to compressive stress and exposing zones below the surface of the workpiece to axial and tangential tensile stresses.

The Applicants respectfully disagree. Abramsen teaches a process and an apparatus for forming cold-worked, bar-shaped round stock, which do not expand upon the teachings of the prior art. Prior art methods of drawing and extruding workpieces, e.g., elongated sections of metal, and more particularly aluminum, are subject to common problems. First, an oxide film of considerable thickness generally forms on the outer surface of the workpiece. Furthermore, during the drawing or extruding process, metal longitudinal cracks and the like generally form on the surface thereof. This problem is particularly more prevalent with aluminum workpieces. These oxide films and longitudinal cracks reduce the strength of the workpiece. Thus, the workpiece must be cleaned or the material surface must be removed in order to minimize this strength reduction, a process which is highly labor and cost-intensive.

In addition, production of workpieces by prior art drawing or extruding steps generally results in workpieces with dimensions of extremely large tolerances. The workpieces must therefore be further worked to straighten or shape them to their desired dimensions, increasing the required labor and cost expenditures.

In an attempt to address these problems, Abramsen describes a multi-stage process and apparatus.

In a first stage (10) the mill scale on the surface of the round stock (12) is first removed from the fed round stock (12) by about 80-90 % (col. 4, lines 38-45). For this purpose, two work

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rolls (22, 24) with a concave surface (29) are provided, which have a rugulose surface (30) and which are arranged cross-wise to each other (col. 4, line 66 to col. 5, line 15 and Figs. 1 and 2). The rugulose surface is a rough, abrading surface (col. 5, lines 1-3, 48-49 and col. 6, lines 8-9). The surface (30) of each of the work rolls (22, 24) frictionally engages the surface of the round stock (12) to deform and roughen the surface (col. 2, lines 52-65 and col. 5, lines 13-16). Thus, both a rotary and linear movement of the round stock is simultaneously produced (col. 5, lines 50-52). It is the abrading effect of the rugulose surface (30) that removes the scale from the surface of the round stock (12) (col. 6, lines 17-23 and Fig. 4). "Thus, in the first stage of the forming process the primary scale remover 14 removes substantially all of the mill scale from the surface of the hot rolled round stock 12." (col. 5, lines 20-23) (emphasis added). Accordingly, Abramsen does not disclose that it is either necessary or desirable to place the treated surface of the round stock under compressive stresses, while placing areas of the round stock lying below the treated surface under tensile stresses.

Furthermore, in a second stage (16), Abramsen discloses that the round stock is then sand blasted or the like to remove the remaining mills scale from the surface of the stock (col. 7, lines 29-54). In the third and final stage (18), the round stock (12) is milled down to a desired form and diameter (col. 7, lines 60-67). Thus, even if in the first stage (10) the round stock (12) were placed under compressive and tensile stresses axially and tangentially, as taught by the present invention, these compressive and tensile stresses would be removed in the third stage (18) by the milling process.

As a result, it can be seen that Abramsen only teaches a process and apparatus for scale removal that was already known in the prior art.

In contrast, claim 1 of the present invention is directed to a novel method for solving the above problems. The method as recited in claim 1 provides the following distinct advantages over the prior art (see p. 2, para. 3 to p. 3, para.1 of the specification):

1. The compressive stresses imparted to the treated surface of the workpiece and the tensile stresses imparted beneath the treated surface of the workpiece increase and/or enhance the

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strength and/or hardness of the workpiece. The stresses are continuous along the entire length and circumference of the workpiece, resulting in a very high strength and/or hardness of the workpiece of metal. For example, the strength and hardness of a workpiece of steel and alloyed steel can be increased. Additionally, by using the method of the present invention a workpiece of aluminum or an alloyed aluminum can be formed, with a strength and hardness that is the same or even greater than that of the steel or alloyed steel.

2. As the strength and/or hardness of a workpiece of aluminum or an alloyed aluminum is/are the same or greater than that/those of steel and alloyed steel, the weight of the workpiece can be reduced by using a workpiece of aluminum or alloyed aluminum.
3. The method cleans the surface of the material and/or the zone near the surface of oxide crusts and detrimental soilages.
4. The accuracy of the workpiece is enhanced.
5. The smoothness of the workpiece is enhanced.
6. The workpiece can be provided with galvanic coatings without the usual problem of hydrogen embrittlement.
7. Labor and cost expenditures are reduced.

Furthermore, as discussed above, amended claim 1 adds the limitation from canceled claim 3 that "the outer profile (22, 22', 76, 76', 78, 78') of the at least one roll (16, 16', 16'', 74', 74'', 86', 86'') works the workpiece (12, 12', 12'') in a direction that is longitudinal or transverse to a direction of movement of the workpiece (12, 12', 12'')." Contrary to the Examiner's assertion in the rejection of claim 3, Abramsen does not disclose this feature. Figure 4 of Abramsen, cited by the Examiner, merely shows two work rolls (22, 24) which are rotating about a round (12) in opposite directions. Claim 1, as amended, is not directed to this feature. As described in the specification of the present application, this limitation refers to a method by which "the surface of the workpiece to be treated is worked preferably transversely to the

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direction of movement of the workpiece first in one direction and then in the direction opposite thereto.” (page 3, para. 4) (see also page 9, para. 5; page 12, paras. 4-5; page 19, para. 3; page 25, para. 1; and page 29, para. 3). Thus, this limitation is not directed to the relative direction of rotation of the rolls to each other, but to the orientation of the outer profile in comparison to the transverse direction of movement of the workpiece. The Applicants assert that this limitation is not taught by Abramsen or any of the other prior art of record.

Accordingly, Applicants assert that the method of amended claim 1 is not disclosed by the prior art of record, and Applicants respectfully request that its rejection be withdrawn.

Furthermore, regarding the rejection of claim 4, the Examiner asserts that Figure 3 of Abramsen discloses that a roll is rotatable about the workpiece. Applicants respectfully disagree. Figure 3 illustrates a backing roll which supports a work roll; there is no teaching that either of these rolls is rotatable about the workpiece itself. Applicants therefore assert that claim 4 is independently patentable over the prior art of record, and request that the rejection of claim 4 be withdrawn.

Claims 2, 4, 6-11, 18, 53, 54 and 58 are dependent on claim 1 and incorporate all of its limitations. As Applicants assert that claim 1, as amended, is now in a condition for allowance, Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 103 over AAPA in view of Abramsen be withdrawn.

**Rejections Under 35 U.S.C. § 103(a) using Abramsen in view of AAPA:**

Claims 1-4, 6-11, 18, 53, and 54 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abramsen in view of AAPA. For the reasons discussed above, Applicants assert that the prior art of record does not disclose all elements of amended claim 1. Applicants therefore request that the rejection of claim 1 and the rejections of claims 2, 4, 6-11, 18, 53 and 54, dependent on claim 1 and including all of its limitations, be withdrawn.

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**Rejections Under 35 U.S.C. § 103(a) using Strite (U.S. Patent No. 567,756) in view of AAPA:**

Claims 1-3, 12-17, 53, and 58 stand rejected under 35 U.S.C. § 103(a) as being obvious over Strite in view of AAPA. For the reasons discussed above, Applicants assert that AAPA does not disclose all elements of amended claim 1. Furthermore, Strite does not provide any disclosure to remedy the deficiencies discussed above. Applicants therefore request that the rejection of claim 1 and the rejections of claims 2, 12-17, 53 and 58, dependent on claim 1 and including all of its limitations, be withdrawn.

**Rejection Under 35 U.S.C. § 103(a) using AAPA in view of Abramsen and further in view of Russell (U.S. Patent No. 6,062,645):**

Claim 54 stands rejected under 35 U.S.C. § 103(a) as being obvious over AAPA in view of Abramsen and further in view of Russell. For the reasons discussed above, Applicants assert that AAPA and Abramsen do not disclose all elements of amended claim 1. Furthermore, Russell does not provide any disclosure to remedy the deficiencies discussed above. Applicants therefore request that the rejection of claim 54, dependent on claim 1 and including all of its limitations, be withdrawn.

**Rejection Under 35 U.S.C. § 103(a) using AAPA in view of Abramsen and further in view of Shiao (U.S. Patent No. 4,640,500):**

Claim 55 stands rejected under 35 U.S.C. § 103(a) as being obvious over AAPA in view of Abramsen and further in view of Shiao. For the reasons discussed above, Applicants assert that AAPA and Abramsen do not disclose all elements of amended claim 1. Furthermore, Shiao does not provide any disclosure to remedy the deficiencies discussed above. Applicants therefore request that the rejection of claim 55, dependent on claim 1 and including all of its limitations, be withdrawn.

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**Rejection Under 35 U.S.C. § 103(a) using AAPA in view of Abramsen and further in view of Fredrick (U.S. Patent No. 5,671,976):**

Claim 57 stands rejected under 35 U.S.C. § 103(a) as being obvious over AAPA in view of Abramsen and further in view of Fredrick. For the reasons discussed above, Applicants assert that AAPA and Abramsen do not disclose all elements of amended claim 1. Furthermore, Fredrick does not provide any disclosure to remedy the deficiencies discussed above. Applicants therefore request that the rejection of claim 57, dependent on claim 1 and including all of its limitations, be withdrawn.

**Rejection Under 35 U.S.C. § 103(a) using Abramsen in view of AAPA and further in view of Russell:**

Claim 54 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abramsen in view of AAPA and further in view of Russell. For the reasons discussed above, Applicants assert that the cited prior art does not disclose all elements of amended claim 1. Applicants therefore request that the rejection of claim 54, dependent on claim 1 and including all of its limitations, be withdrawn.

**Rejection Under 35 U.S.C. § 103(a) using Abramsen in view of AAPA and further in view of Shiau:**

Claim 55 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abramsen in view of AAPA and further in view of Shiau. For the reasons discussed above, Applicants assert that the cited prior art does not disclose all elements of amended claim 1. Applicants therefore request that the rejection of claim 55, dependent on claim 1 and including all of its limitations, be withdrawn.



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**Rejection Under 35 U.S.C. § 103(a) using Abramsen in view of AAPA and further in view of Fredrick:**

Claim 54 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abramsen in view of AAPA and further in view of Fredrick. For the reasons discussed above, Applicants assert that the cited prior art does not disclose all elements of amended claim 1. Applicants therefore request that the rejection of claim 54, dependent on claim 1 and including all of its limitations, be withdrawn.

**Rejections Under 35 U.S.C. § 103(a) using McQueen (U.S. Patent No. 5,460,563) in view of Seki et al. (U.S. Patent No. 5,356,665):**

Claims 1, 2, 4, 5, 18, 53 and 58 stand rejected under 35 U.S.C. § 103(a) as being obvious over McQueen in view of Seki et al. The Examiner asserts that McQueen teaches the claimed invention with the exception of aluminum or aluminum alloy workpieces, which the Examiner alleges is taught by Seki et al. Applicants assert that the cited prior art does not disclose the elements of amended claim 1. In particular, neither McQueen nor Seki et al. discloses application of compressive and tensile stresses as discussed above. Furthermore, neither McQueen nor Seki et al. discloses the limitation, incorporated from canceled claim 3, that "the outer profile (22, 22', 76, 76', 78, 78') of the at least one roll (16, 16', 16'', 74', 74'', 86', 86'') works the workpiece (12, 12', 12'') in a direction that is longitudinal or transverse to a direction of movement of the workpiece (12, 12', 12'')." Applicants therefore assert that claim 1 is in a condition for allowance, and request that the rejection of claim 1 under 35 U.S.C. § 103 over McQueen in view of Seki et al. be withdrawn.

Claims 2, 4, 5, 18, 53 and 58 are dependent on claim 1 and incorporate all of its limitations. As it is asserted that claim 1 is in a condition for allowance, Applicants respectfully request that the rejection of these claims be withdrawn.

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**Request for Withdrawal of Finality of the Office Action**

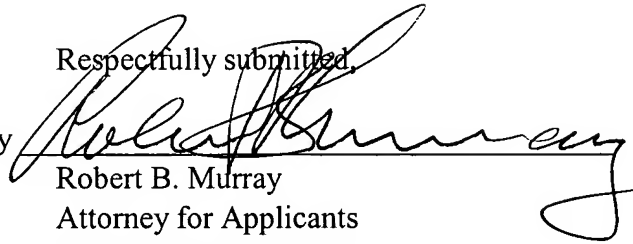
Applicants respectfully request that the Examiner withdraw the finality of this Office Action. In the first Office Action mailed February 12, 2003, the Examiner refused to conduct a patentability review, claiming that “[a] statement on patentability cannot be made at this time in view of the examiner’s lack of understanding of the disclosure and claims.” In response, the Applicants amended the claims to correct the deficiencies under 35 U.S.C. § 112. The Examiner then made the present Office Action final, rejecting all claims on patentability grounds and stating that the Applicants’ amendment necessitated the new grounds for rejection. Applicants respectfully assert that this procedure was improper. Under the Examiner’s reasoning, it would be impossible to develop a clear issue between the Examiner and the Applicant for appeal. The Examiner can refuse to enter the after-final amendments in this response without ever providing a response to Applicant’s arguments for patentability. Applicants assert that this is contrary to the provisions of § 706.07 of the Manual of Patent Examining Procedure (“MPEP”) (“To bring the prosecution to as speedy conclusion as possible and at the same time to deal justly by both the applicant and the public, the invention as disclosed and claimed should be thoroughly searched in the first action and the references fully applied.”). Applicants respectfully assert that the question of patentability has not been sufficiently developed for appeal, as required by the § 706.07 (“The applicant who is seeking to define his or her invention in claims that will give him or her the patent protection to which he or she is justly entitled should receive the cooperation of the examiner to that end, and not be prematurely cut off in the prosecution of his or her application.”).\

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Accordingly, Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

By

A handwritten signature in black ink, appearing to read "Robert B. Murray", written over a horizontal line.

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